

2004 07 12 Sequence Listing  
SEQUENCE LISTING

<110> ID-Lelystad, Instituut voor Dierhouderij en Diergezondheid B.V.  
Willemsen, Petrus T.J.  
Westerveen, Sjoukje F.  
Bakker, Douwe  
Zijderfeld van, Fred G.  
Thole, Jelle E.R.

<120> Paramycobacterial diagnostics and vaccines

<130> P54977PC00

<140> PCT/NL03/00020

<141> 2003-01-13

<150> EP 02075089.9

<151> 2002-01-11

<160> 22

<170> PatentIn Ver. 2.1

<210> 1

<211> 1175

<212> DNA

<213> Mycobacterium avium paratuberculosis

<220>

<223> Description of Combined DNA/RNA Molecule:  
immunogenic protein of M. avium paratuberculosis

<220>

<221> CDS

<222> (134)..(1144)

<400> 1

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agaggagact tcc gtg ccg aac cga cgc cga cgc aag ctt tcg aca gcc 169
                Val Pro Asn Arg Arg Arg Arg Lys Leu Ser Thr Ala
                1          5          10
atg agc gcg gtc gcc gcc ctg gca gtg gcg agt cct tgc gca tac ttc 217
Met Ser Ala Val Ala Ala Leu Ala Val Ala Ser Pro Cys Ala Tyr Phe
          15          20          25
ctt gtc tac gaa tcg acg gcc ggc aac aag gcg ccc gag cac cac gag 265
Leu Val Tyr Glu Ser Thr Ala Gly Asn Lys Ala Pro Glu His His Glu
          30          35          40
ttc aag cag gcc gca gtg atg agc gat ctg ccg ggc gag ctg atg ggt 313
Phe Lys Gln Ala Ala Val Met Ser Asp Leu Pro Gly Glu Leu Met Gly
          45          50          55          60
gcg ctg tcg cag ggc ctg tcg cag ttt ggg atc aac ctg ccc ccg gtg 361
Ala Leu Ser Gln Gly Leu Ser Gln Phe Gly Ile Asn Leu Pro Pro Val
          65          70          75
ccc gcc ctg agc ggc ggc gcc acc agc act ccc ggt ctg gcc agc ccc 409
Pro Ala Leu Ser Gly Gly Ala Thr Ser Thr Pro Gly Leu Ala Ser Pro

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80

85

90

ggc	ctg	ggt	agc	ccc	ggc	ctg	ggc	acg	ccc	ggc	ctg	gga	acg	ccg	ggc	457
Gly	Leu	Gly	Ser	Pro	Gly	Leu	Gly	Thr	Pro	Gly	Leu	Gly	Thr	Pro	Gly	
		95					100					105				
ctg	acc	aat	ccc	ggt	ctg	acg	agc	ccc	ggt	gcg	acc	agt	ccc	ggc	ctg	505
Leu	Thr	Asn	Pro	Gly	Leu	Thr	Ser	Pro	Gly	Ala	Thr	Ser	Pro	Gly	Leu	
	110					115					120					
acc	agt	ccc	ggc	ctg	acc	agt	cct	ggt	ttg	acc	agc	ccc	ggt	ctg	acc	553
Thr	Ser	Pro	Gly	Leu	Thr	Ser	Pro	Gly	Leu	Thr	Ser	Pro	Gly	Leu	Thr	
125					130					135					140	
agc	ccg	ggt	gcg	gcg	ccg	acg	acg	ccc	ggg	ctc	acc	gcg	ccc	ggc	gcg	601
Ser	Pro	Gly	Ala	Ala	Pro	Thr	Thr	Pro	Gly	Leu	Thr	Ala	Pro	Gly	Ala	
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ctg	ccg	acc	acg	ccg	ggc	ggc	ggg	gtc	gcc	acc	ccc	ggc	gcc	ggg	ctc	649
Leu	Pro	Thr	Thr	Pro	Gly	Gly	Gly	Val	Ala	Thr	Pro	Gly	Ala	Gly	Leu	
			160					165					170			
aac	ccc	gcg	ctg	tcc	aac	ccc	ggg	ctg	acc	agc	ccg	gcc	ggg	acg	gcg	697
Asn	Pro	Ala	Leu	Ser	Asn	Pro	Gly	Leu	Thr	Ser	Pro	Ala	Gly	Thr	Ala	
		175					180					185				
ccg	ggg	ctg	ggc	agc	ccg	acc	gtg	gcg	ccg	agt	gag	gtg	ccg	atc	gac	745
Pro	Gly	Leu	Gly	Ser	Pro	Thr	Val	Ala	Pro	Ser	Glu	Val	Pro	Ile	Asp	
	190					195					200					
tcc	ggg	gcc	ggc	ctg	gac	ccg	ggc	gcc	ggt	ggc	acg	tac	ccg	atc	ctg	793
Ser	Gly	Ala	Gly	Leu	Asp	Pro	Gly	Ala	Gly	Gly	Thr	Tyr	Pro	Ile	Leu	
205					210					215					220	
ggc	gac	ccg	tcg	acc	ttc	ggt	aac	gcc	tcg	ccg	atc	ggc	ggc	ggt	ggc	841
Gly	Asp	Pro	Ser	Thr	Phe	Gly	Asn	Ala	Ser	Pro	Ile	Gly	Gly	Gly	Gly	
				225					230					235		
acc	ggt	ctg	ggc	ggc	ggc	tcg	agc	tcg	ggt	ggc	agc	ggc	ggc	ctg	gtc	889
Thr	Gly	Leu	Gly	Gly	Gly	Ser	Ser	Ser	Gly	Gly	Ser	Gly	Gly	Leu	Val	
			240					245					250			
aac	gac	gtg	atg	caa	gcc	gcc	aac	cag	ctc	ggc	gcg	ggt	cag	gcg	atc	937
Asn	Asp	Val	Met	Gln	Ala	Ala	Asn	Gln	Leu	Gly	Ala	Gly	Gln	Ala	Ile	
		255					260					265				
gac	ctg	ctc	aag	ggc	ctg	gtg	atg	ccg	gcg	atc	acg	cag	ggc	atg	cac	985
Asp	Leu	Leu	Lys	Gly	Leu	Val	Met	Pro	Ala	Ile	Thr	Gln	Gly	Met	His	
	270					275					280					
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Gly	Gly	Ala	Ala	Ala	Gly	Ala	Leu	Pro	Gly	Ala	Ala	Gly	Ala	Leu	Pro	
285					290					295					300	
ggc	gcg	gcc	ggc	gcc	ctg	ccc	ggt	gcg	gcc	ggc	gcc	ctg	ccg	ggt	gcg	1081
Gly	Ala	Ala	Gly	Ala	Leu	Pro	Gly	Ala	Ala	Gly	Ala	Leu	Pro	Gly	Ala	
				305					310					315		
gcg	ggc	gcc	gcg	ggt	gcg	ttg	ccg	gcg	gcc	gcc	ggc	gcc	gcg	ccg	gca	1129
Ala	Gly	Ala	Ala	Gly	Ala	Leu	Pro	Ala	Ala	Ala	Gly	Ala	Ala	Pro	Ala	
			320					325				330				
ctg	ccc	ccg	gtc	tag	acctttttcca	aaccatccac	cagacggcac	c								1175

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Leu Pro Pro Val  
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<210> 2

<211> 336

<212> PRT

<213> Mycobacterium avium paratuberculosis

<223> Description of Combined DNA/RNA Molecule:

immunogenic protein of M. avium paratuberculosis

<400> 2

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Ala Ala Leu Ala Val Ala Ser Pro Cys Ala Tyr Phe Leu Val Tyr Glu
 20      25      30
Ser Thr Ala Gly Asn Lys Ala Pro Glu His His Glu Phe Lys Gln Ala
 35      40      45
Ala Val Met Ser Asp Leu Pro Gly Glu Leu Met Gly Ala Leu Ser Gln
 50      55      60
Gly Leu Ser Gln Phe Gly Ile Asn Leu Pro Pro Val Pro Ala Leu Ser
 65      70      75
Gly Gly Ala Thr Ser Thr Pro Gly Leu Ala Ser Pro Gly Leu Gly Ser
 85      90      95
Pro Gly Leu Gly Thr Pro Gly Leu Gly Thr Pro Gly Leu Thr Asn Pro
100      105      110
Gly Leu Thr Ser Pro Gly Ala Thr Ser Pro Gly Leu Thr Ser Pro Gly
115      120      125
Leu Thr Ser Pro Gly Leu Thr Ser Pro Gly Leu Thr Ser Pro Gly Ala
130      135      140
Ala Pro Thr Thr Pro Gly Leu Thr Ala Pro Gly Ala Leu Pro Thr Thr
145      150      155
Pro Gly Gly Gly Val Ala Thr Pro Gly Ala Gly Leu Asn Pro Ala Leu
165      170      175
Ser Asn Pro Gly Leu Thr Ser Pro Ala Gly Thr Ala Pro Gly Leu Gly
180      185      190
Ser Pro Thr Val Ala Pro Ser Glu Val Pro Ile Asp Ser Gly Ala Gly
195      200      205
Leu Asp Pro Gly Ala Gly Gly Thr Tyr Pro Ile Leu Gly Asp Pro Ser
210      215      220
Thr Phe Gly Asn Ala Ser Pro Ile Gly Gly Gly Gly Thr Gly Leu Gly
225      230      235
Gly Gly Ser Ser Ser Gly Gly Ser Gly Gly Leu Val Asn Asp Val Met
245      250      255
Gln Ala Ala Asn Gln Leu Gly Ala Gly Gln Ala Ile Asp Leu Leu Lys
260      265      270
Gly Leu Val Met Pro Ala Ile Thr Gln Gly Met His Gly Gly Ala Ala
275      280      285
Ala Gly Ala Leu Pro Gly Ala Ala Gly Ala Leu Pro Gly Ala Ala Gly
290      295      300
Ala Leu Pro Gly Ala Ala Gly Ala Leu Pro Gly Ala Ala Gly Ala Ala
305      310      315
Gly Ala Leu Pro Ala Ala Ala Gly Ala Ala Pro Ala Leu Pro Pro Val
325      330      335

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<210> 3

<211> 600

<212> DNA

<213> Mycobacterium avium paratuberculosis

<220>

2004 07 12 Sequence Listing

<223> Description of Combined DNA/RNA Molecule:  
immunogenic protein of M. avium paratuberculosis

<220>

<221> CDS

<222> (67)..(567)

<400> 3

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    Met Ser Arg Leu Ser Phe Val Cys Arg Leu Leu Ala Ala Thr
        1             5             10
gct ttc gcc gtc gcc ctg cta ctc ggg ctg ggc gac gtg ccg cgc gcg 156
Ala Phe Ala Val Ala Leu Leu Leu Gly Leu Gly Asp Val Pro Arg Ala
    15             20             25             30
gcg gcc acc gac gac cgc ctg caa ttc acc gcg acc acg ctc agc ggc 204
Ala Ala Thr Asp Asp Arg Leu Gln Phe Thr Ala Thr Thr Leu Ser Gly
    35             40             45
gcg ccg ttc aac ggc gcc agt ctg cag ggc aag ccc gcc gtg ctg tgg 252
Ala Pro Phe Asn Gly Ala Ser Leu Gln Gly Lys Pro Ala Val Leu Trp
    50             55             60
ttc tgg acg ccg tgg tgc ccg tac tgc aac gcc gag gcc ccg ggc gtg 300
Phe Trp Thr Pro Trp Cys Pro Tyr Cys Asn Ala Glu Ala Pro Gly Val
    65             70             75
agc cgg gtg gcc gcc gcc aac ccg ggc gtc acc ttc gtc ggc gtc gcc 348
Ser Arg Val Ala Ala Ala Asn Pro Gly Val Thr Phe Val Gly Val Ala
    80             85             90
gcc cac tcc gaa gtc ggc gcc atg gcc aac ttc gtc tcc aag tac aac 396
Ala His Ser Glu Val Gly Ala Met Ala Asn Phe Val Ser Lys Tyr Asn
    95             100             105             110
ctg aac ttc acc acg ctc aac gac gcc gac ggc gcg atc tgg gcc cgc 444
Leu Asn Phe Thr Thr Leu Asn Asp Ala Asp Gly Ala Ile Trp Ala Arg
    115             120             125
tac ggc gtg ccc tgg cag ccc gcg tac gtg ttc tac cgg gcg gac ggc 492
Tyr Gly Val Pro Trp Gln Pro Ala Tyr Val Phe Tyr Arg Ala Asp Gly
    130             135             140
agc tcc acc ttc gtc aac aac ccc acc tcg gcg atg ccc cag gac gaa 540
Ser Ser Thr Phe Val Asn Asn Pro Thr Ser Ala Met Pro Gln Asp Glu
    145             150             155
ctg gcc gcc cgg gtg gcg gcg ctg cgc tgacgtggac cgcggtctgg 587
Leu Ala Ala Arg Val Ala Ala Leu Arg
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<210> 4

<211> 167

<212> PRT

<213> Mycobacterium avium paratuberculosis

<223> Description of Combined DNA/RNA Molecule:  
immunogenic protein of M. avium paratuberculosis

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<400> 4

Met Ser Arg Leu Ser Phe Val Cys Arg Leu Leu Ala Ala Thr Ala Phe  
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Ala Val Ala Leu Leu Leu Gly Leu Gly Asp Val Pro Arg Ala Ala Ala  
20 25 30  
Thr Asp Asp Arg Leu Gln Phe Thr Ala Thr Thr Leu Ser Gly Ala Pro  
35 40 45  
Phe Asn Gly Ala Ser Leu Gln Gly Lys Pro Ala Val Leu Trp Phe Trp  
50 55 60  
Thr Pro Trp Cys Pro Tyr Cys Asn Ala Glu Ala Pro Gly Val Ser Arg  
65 70 75 80  
Val Ala Ala Ala Asn Pro Gly Val Thr Phe Val Gly Val Ala Ala His  
85 90 95  
Ser Glu Val Gly Ala Met Ala Asn Phe Val Ser Lys Tyr Asn Leu Asn  
100 105 110  
Phe Thr Thr Leu Asn Asp Ala Asp Gly Ala Ile Trp Ala Arg Tyr Gly  
115 120 125  
Val Pro Trp Gln Pro Ala Tyr Val Phe Tyr Arg Ala Asp Gly Ser Ser  
130 135 140  
Thr Phe Val Asn Asn Pro Thr Ser Ala Met Pro Gln Asp Glu Leu Ala  
145 150 155 160  
Ala Arg Val Ala Ala Leu Arg  
165

<210> 5

<211> 366

<212> DNA

<213> Mycobacterium avium paratuberculosis

<220>

<223> Description of Combined DNA/RNA Molecule:  
immunogenic protein of M. avium paratuberculosis

<220>

<221> CDS

<222> (34)..(366)

<400> 5

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1 5  
ttg ggc gtt gcg gtg ggc agc gcg gca gtg gca ttg acc gcc gcg gcc 102  
Leu Gly Val Ala Val Gly Ser Ala Ala Val Ala Leu Thr Ala Ala Ala  
10 15 20  
ggt gtc gca tcc gcc gac ccc atg gac gcg atc atc aac acc acc tgc 150  
Gly Val Ala Ser Ala Asp Pro Met Asp Ala Ile Ile Asn Thr Thr Cys  
25 30 35

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aac tac ggg cag gtg atc gcc gcg ctg aac gcg tcc gac ccg gcg gct 198
Asn Tyr Gly Gln Val Ile Ala Ala Leu Asn Ala Ser Asp Pro Ala Ala
40 45 50 55

gcc cag cag ctg aac tcg tcg ccg atg gcg cag tcc tac atc cag ccg 246
Ala Gln Gln Leu Asn Ser Ser Pro Met Ala Gln Ser Tyr Ile Gln Arg
60 65 70

ttc ctg gcc tcc ccg ccg gcg aag cgt cag cag atg gcc cag cag atc 294
Phe Leu Ala Ser Pro Pro Ala Lys Arg Gln Gln Met Ala Gln Gln Ile
75 80 85

cag ggc atg ccg gcc gcg cag cag tac atc aac gac atc aac cag gtc 342
Gln Gly Met Pro Ala Ala Gln Gln Tyr Ile Asn Asp Ile Asn Gln Val
90 95 100

gcg gtc acc tgt aac aac ttc tga 366
Ala Val Thr Cys Asn Asn Phe
105 110

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<210> 6  
 <211> 110  
 <212> PRT  
 <213> Mycobacterium avium paratuberculosis  
 <223> Description of Combined DNA/RNA Molecule:  
 immunogenic protein of M. avium paratuberculosis

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35 40 45
Asn Ala Ser Asp Pro Ala Ala Ala Gln Gln Leu Asn Ser Ser Pro Met
50 55 60
Ala Gln Ser Tyr Ile Gln Arg Phe Leu Ala Ser Pro Pro Ala Lys Arg
65 70 75 80
Gln Gln Met Ala Gln Gln Ile Gln Gly Met Pro Ala Ala Gln Gln Tyr
85 90 95
Ile Asn Asp Ile Asn Gln Val Ala Val Thr Cys Asn Asn Phe
100 105 110

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<210> 7  
 <211> 1410  
 <212> DNA  
 <213> Mycobacterium avium paratuberculosis  
 <220>  
 <223> Description of Combined DNA/RNA Molecule:  
 immunogenic protein of M. avium paratuberculosis

<220>  
 <221> CDS  
 <222> (46)..(1410)

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<400> 7
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Val Ala Pro Lys
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# 2004 07 12 Sequence Listing

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Val	Ser	Ser	Asp	Leu	Phe	Ser	Gln	Ile	Val	Asn	Ser	Gly	Pro	Gly	Ser	
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Phe	Leu	Ala	Lys	Gln	Leu	Gly	Val	Pro	Gln	Pro	Glu	Thr	Leu	Arg	Arg	
				25					30					35		
tac	cgg	ccc	ggt	gac	ccg	ccg	ctg	gcc	ggg	tcg	ctg	ctg	atc	ggc	ggc	201
Tyr	Arg	Pro	Gly	Asp	Pro	Pro	Leu	Ala	Gly	Ser	Leu	Leu	Ile	Gly	Gly	
			40					45					50			
gag	ggc	cgc	gtg	gtc	gag	ccg	ctg	cgg	gcg	gcg	ctg	gcc	aag	gac	tac	249
Glu	Gly	Arg	Val	Val	Glu	Pro	Leu	Arg	Ala	Ala	Leu	Ala	Lys	Asp	Tyr	
		55					60					65				
gac	ctg	gtc	ggc	aac	aac	ctg	ggc	ggg	cgc	tgg	gcc	gac	cgg	ttc	ggc	297
Asp	Leu	Val	Gly	Asn	Asn	Leu	Gly	Gly	Arg	Trp	Ala	Asp	Arg	Phe	Gly	
	70					75					80					
ggg	ctg	gtc	ttc	gac	gcc	acc	ggg	atc	acc	acc	ccg	gag	ggc	ctg	aag	345
Gly	Leu	Val	Phe	Asp	Ala	Thr	Gly	Ile	Thr	Thr	Pro	Glu	Gly	Leu	Lys	
	85				90					95					100	
ggg	ctg	tac	gag	ttc	ttc	acc	cca	ctg	ctg	cgc	aac	ctg	ggt	cac	tgc	393
Gly	Leu	Tyr	Glu	Phe	Phe	Thr	Pro	Leu	Leu	Arg	Asn	Leu	Gly	His	Cys	
				105					110					115		
gcc	cgc	gtg	gtg	gtg	gtc	ggc	acc	acg	ccc	gac	gcc	gcc	gcc	ggc	ccg	441
Ala	Arg	Val	Val	Val	Val	Gly	Thr	Thr	Pro	Asp	Ala	Ala	Ala	Gly	Pro	
			120				125					130				
cac	gag	cgg	atc	gcc	cag	cgc	gcc	ctg	gag	ggc	ttc	acc	cgg	tca	ttg	489
His	Glu	Arg	Ile	Ala	Gln	Arg	Ala	Leu	Glu	Gly	Phe	Thr	Arg	Ser	Leu	
		135					140					145				
ggc	aag	gag	ctg	cgc	aac	ggc	tcg	acg	gtg	gcg	ctg	gtg	tac	ctg	tcg	537
Gly	Lys	Glu	Leu	Arg	Asn	Gly	Ser	Thr	Val	Ala	Leu	Val	Tyr	Leu	Ser	
	150					155					160					
ccg	gcc	gcc	aaa	ccc	gcc	gcg	acg	ggc	ctg	gag	tcg	acc	atg	cgg	ttc	585
Pro	Ala	Ala	Lys	Pro	Ala	Ala	Thr	Gly	Leu	Glu	Ser	Thr	Met	Arg	Phe	
	165				170				175						180	
atc	ctg	tcg	gcc	aag	tcc	gcc	tac	gtc	gac	ggc	cag	gtc	ttc	tac	gtc	633
Ile	Leu	Ser	Ala	Lys	Ser	Ala	Tyr	Val	Asp	Gly	Gln	Val	Phe	Tyr	Val	
				185					190					195		
ggc	gag	gcc	gac	tcc	acc	ccc	ccg	gcg	gac	tgg	gaa	cgg	ccg	ctg	gac	681
Gly	Glu	Ala	Asp	Ser	Thr	Pro	Pro	Ala	Asp	Trp	Glu	Arg	Pro	Leu	Asp	
			200					205					210			
ggc	aag	gtc	gcc	atc	gtg	acc	ggt	gcg	gcc	cgc	gga	atc	ggc	gcc	acg	729
Gly	Lys	Val	Ala	Ile	Val	Thr	Gly	Ala	Ala	Arg	Gly	Ile	Gly	Ala	Thr	
		215					220					225				
atc	gcc	gag	gtg	ttc	gcc	cgc	gac	ggc	gcc	cgc	gtg	gtc	gcg	atc	gac	777
Ile	Ala	Glu	Val	Phe	Ala	Arg	Asp	Gly	Ala	Arg	Val	Val	Ala	Ile	Asp	
	230					235					240					
gtg	gaa	tcg	gcc	gcc	gag	acg	ctg	gcc	gag	acg	gcc	agc	cgg	gtc	ggc	825
Val	Glu	Ser	Ala	Ala	Glu	Thr	Leu	Ala	Glu	Thr	Ala	Ser	Arg	Val	Gly	

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245	250	255	260	
ggc acc gcg ctg tgg ctc gac gtc acc gcc ccc gac gcc gtc gac aag 873 Gly Thr Ala Leu Trp Leu Asp Val Thr Ala Pro Asp Ala Val Asp Lys	265	270	275	
atc acc gag cac ctg cgc gag cac cac gcc ggt cac gcc gac atc ctg 921 Ile Thr Glu His Leu Arg Glu His His Gly Gly His Ala Asp Ile Leu	280	285	290	
gtc aac aac gcc ggg atc acc cgc gac aag ctg ctg gcc aac atg gac 969 Val Asn Asn Ala Gly Ile Thr Arg Asp Lys Leu Leu Ala Asn Met Asp	295	300	305	
gac gcg cgc tgg gac gcc gtg ttg gcc gtg aat ctg ctt gcc cca ctt 1017 Asp Ala Arg Trp Asp Ala Val Leu Ala Val Asn Leu Leu Ala Pro Leu	310	315	320	
cgc ctt acc gaa ggg ctg gtg ggc aac ggc agc atc ggc gaa ggc ggc 1065 Arg Leu Thr Glu Gly Leu Val Gly Asn Gly Ser Ile Gly Glu Gly Gly	325	330	335	340
cgc atc gtc ggc ctt tcg tcg atg gcc ggc atc gcg ggc aac cgc ggc 1113 Arg Ile Val Gly Leu Ser Ser Met Ala Gly Ile Ala Gly Asn Arg Gly	345	350	355	
cag acc aac tac gcc acc acc aag gca ggc atg atc ggc ctc acc cag 1161 Gln Thr Asn Tyr Ala Thr Thr Lys Ala Gly Met Ile Gly Leu Thr Gln	360	365	370	
gcg ctg gcg ccg gag ctc tac gac aag ggc atc acc atc aac gcc gtc 1209 Ala Leu Ala Pro Glu Leu Tyr Asp Lys Gly Ile Thr Ile Asn Ala Val	375	380	385	
gcg ccg gga ttc atc gag acc cag atg acg gcc gcc atc ccg ctg gcc 1257 Ala Pro Gly Phe Ile Glu Thr Gln Met Thr Ala Ala Ile Pro Leu Ala	390	395	400	
acc cgc gag gtg ggg cgc cgg atg aac tcg ctg ctg cag ggc ggg cag 1305 Thr Arg Glu Val Gly Arg Arg Met Asn Ser Leu Leu Gln Gly Gly Gln	405	410	415	420
ccg gtg gac gtc gcc gaa acc atc gcc tac ttc gcc agc ccg gcg tcg 1353 Pro Val Asp Val Ala Glu Thr Ile Ala Tyr Phe Ala Ser Pro Ala Ser	425	430	435	
aac gcg gtg acc ggc aac gtc atc cgg gtc tgc ggc cag gcg atg ctg 1401 Asn Ala Val Thr Gly Asn Val Ile Arg Val Cys Gly Gln Ala Met Leu	440	445	450	
ggg gca tga Gly Ala 455 1410				

<210> 8

<211> 454

<212> PRT

<213> Mycobacterium avium paratuberculosis

<223> Description of Combined DNA/RNA Molecule:  
immunogenic protein of M. avium paratuberculosis

<400> 8



# 2004 07 12 Sequence Listing

Val<sub>1</sub> Ala Pro Lys Val<sub>5</sub> Ser Ser Asp Leu Phe<sub>10</sub> Ser Gln Ile Val<sub>15</sub> Asn Ser  
 Gly Pro Gly Ser<sub>20</sub> Phe Leu Ala Lys Gln<sub>25</sub> Leu Gly Val Pro Gln<sub>30</sub> Pro Glu  
 Thr Leu Arg Arg Tyr Arg Pro Gly<sub>40</sub> Asp Pro Pro Leu Ala<sub>45</sub> Gly Ser Leu  
 Leu Ile<sub>50</sub> Gly Gly Glu Gly Arg<sub>55</sub> Val Val Glu Pro Leu<sub>60</sub> Arg Ala Ala Leu  
 Ala Lys Asp Tyr Asp Leu<sub>70</sub> Val Gly Asn Asn Leu<sub>75</sub> Gly Gly Arg Trp Ala<sub>80</sub>  
 Asp Arg Phe Gly Gly<sub>85</sub> Leu Val Phe Asp Ala Thr Gly Ile Thr Thr Pro  
 Glu Gly Leu Lys<sub>100</sub> Gly Leu Tyr Glu Phe<sub>105</sub> Phe Thr Pro Leu Leu<sub>110</sub> Arg Asn  
 Leu Gly His Cys Ala Arg Val<sub>120</sub> Val Val Gly Thr Thr<sub>125</sub> Pro Asp Ala  
 Ala Ala Gly Pro His Glu Arg<sub>135</sub> Ile Ala Gln Arg Ala Leu Glu Gly Phe  
 Thr Arg Ser Leu Gly Lys<sub>150</sub> Glu Leu Arg Asn Gly<sub>155</sub> Ser Thr Val Ala Leu<sub>160</sub>  
 Val Tyr Leu Ser Pro<sub>165</sub> Ala Ala Lys Pro Ala<sub>170</sub> Thr Gly Leu Glu<sub>175</sub> Ser  
 Thr Met Arg Phe<sub>180</sub> Ile Leu Ser Ala Lys<sub>185</sub> Ser Ala Tyr Val Asp Gly Gln  
 Val Phe Tyr Val Gly Glu Ala Asp<sub>200</sub> Ser Thr Pro Pro Ala<sub>205</sub> Asp Trp Glu  
 Arg Pro Leu Asp Gly Lys Val<sub>215</sub> Ala Ile Val Thr Gly<sub>220</sub> Ala Ala Arg Gly  
 Ile Gly Ala Thr Ile Ala Glu Val Phe Ala Arg<sub>235</sub> Asp Gly Ala Arg Val<sub>240</sub>  
 Val Ala Ile Asp Val<sub>245</sub> Glu Ser Ala Ala Glu Thr Leu Ala Glu Thr Ala<sub>255</sub>  
 Ser Arg Val Gly Gly Thr Ala Leu Trp<sub>265</sub> Leu Asp Val Thr Ala<sub>270</sub> Pro Asp  
 Ala Val Asp Lys Ile Thr Glu His<sub>280</sub> Leu Arg Glu His His<sub>285</sub> Gly Gly His  
 Ala Asp Ile Leu Val Asn Asn<sub>295</sub> Ala Gly Ile Thr Arg<sub>300</sub> Asp Lys Leu Leu  
 Ala Asn Met Asp Asp Ala Arg Trp Asp Ala Val Leu Ala Val Asn Leu<sub>320</sub>  
 Leu Ala Pro Leu Arg<sub>325</sub> Leu Thr Glu Gly Leu Val Gly Asn Gly Ser Ile<sub>335</sub>  
 Gly Glu Gly Gly Arg Ile Val Gly Leu Ser Ser Met Ala Gly Ile Ala  
 Gly Asn Arg Gly Gln Thr Asn Tyr<sub>360</sub> Ala Thr Thr Lys Ala Gly Met Ile  
 Gly Leu Thr Gln Ala Leu Ala Pro<sub>375</sub> Gly Phe Ile Glu Thr Gln Met Thr Ala Ala  
 Ile Asn Ala Val Ala Pro<sub>390</sub> Gly Phe Ile Glu Thr Gln Met Thr Ala Ala  
 Ile Pro Leu Ala Thr Arg Glu Val Gly Arg Arg Met Asn Ser Leu Leu  
 Gln Gly Gly Gln Pro Val Asp Val Ala Glu Thr Ile Ala Tyr<sub>430</sub> Phe Ala  
 Ser Pro Ala Ser Asn Ala Val Thr<sub>440</sub> Gly Asn Val Ile Arg<sub>445</sub> Val Cys Gly  
 Gln Ala Met Leu Gly Ala  
 450

<210> 9  
 <211> 625

## 2004 07 12 Sequence Listing

&lt;212&gt; DNA

&lt;213&gt; Mycobacterium avium paratuberculosis

&lt;220&gt;

<223> Description of Combined DNA/RNA Molecule:  
immunogenic protein of M. avium paratuberculosis

&lt;220&gt;

&lt;221&gt; CDS

&lt;222&gt; (179)..(625)

<223> /note="Xaa at location 95 stands for Gln or His,  
at location 118 stands for Gly or Arg, at location  
147 stands for stop codon, Trp or Cys"

&lt;400&gt; 9

```

aattcgcgca tacccgtcac tggtcacaac gccacatgct ggtaggctgt ggaatcgagg 60
gtcaatccgg atcggacccc aacgtcgact tgtgggcgcc aattcgcggg ttttcgcccc 120
gcaagtcgac gttcggcgcg aatcggtgag gtgggcacag gtgaatgacg aagaggac 178
atg ctg gtc gcc acg gtg cgg gcg ttc atc gac cgc gag gtc aaa ccg 226
Met Leu Val Ala Thr Val Arg Ala Phe Ile Asp Arg Glu Val Lys Pro
1 5 10 15
acc gtg cgc gag gtg gag cac gcc gat gcc tat ccc gag gcg tgg atc 274
Thr Val Arg Glu Val Glu His Ala Asp Ala Tyr Pro Glu Ala Trp Ile
20 25 30
gag cag atg aag cgg atc ggg atc tac ggg ctg gcg gtg ccc gag gaa 322
Glu Gln Met Lys Arg Ile Gly Ile Tyr Gly Leu Ala Val Pro Glu Glu
35 40 45
tac ggt ggt tcg ccg gtg tcc atg ccg tgc tac gtg cgg gtc acc gag 370
Tyr Gly Gly Ser Pro Val Ser Met Pro Cys Tyr Val Arg Val Thr Glu
50 55 60
cag ctg gcg cgc ggc tgg atg agc ctg gcc ggg gcg atg ggc ggc cac 418
Gln Leu Ala Arg Gly Trp Met Ser Leu Ala Gly Ala Met Gly Gly His
65 70 75 80
acc gtg gtg gcc aag ctg cta acg ctg ttc ggc acc gag gac cas aag 466
Thr Val Val Ala Lys Leu Leu Thr Leu Phe Gly Thr Glu Asp Xaa Lys
85 90 95
cgg gcc tac ctg ccg cgg atg gcc agc ggc gaa atc cgg gcc acc atg 514
Arg Ala Tyr Leu Pro Arg Met Ala Ser Gly Glu Ile Arg Ala Thr Met
100 105 110
gcg ttg acc gag ccc sgc ggc ggc tcg gac ctg cag aac atg tcg acc 562
Ala Leu Thr Glu Pro Xaa Gly Gly Ser Asp Leu Gln Asn Met Ser Thr
115 120 125
acc gcg ctg ccc gac ccc gac tcc gac ggn ctg gtg gtc aac ggg gcc 610
Thr Ala Leu Pro Asp Pro Asp Ser Asp Xaa Leu Val Val Asn Gly Ala
130 135 140
aag acc tgn atc aac 625
Lys Thr Xaa Ile Asn
145

```

&lt;210&gt; 10

# 2004 07 12 Sequence Listing

<211> 149

<212> PRT

<213> Mycobacterium avium paratuberculosis

<223> Description of Combined DNA/RNA Molecule:

immunogenic protein of M. avium paratuberculosis

<400> 10

Met Leu Val Ala Thr Val Arg Ala Phe Ile Asp Arg Glu Val Lys Pro  
1 5 10 15

Thr Val Arg Glu Val Glu His Ala Asp Ala Tyr Pro Glu Ala Trp Ile  
20 25 30

Glu Gln Met Lys Arg Ile Gly Ile Tyr Gly Leu Ala Val Pro Glu Glu  
35 40 45

Tyr Gly Gly Ser Pro Val Ser Met Pro Cys Tyr Val Arg Val Thr Glu  
50 55 60

Gln Leu Ala Arg Gly Trp Met Ser Leu Ala Gly Ala Met Gly Gly His  
65 70 75 80

Thr Val Val Ala Lys Leu Leu Thr Leu Phe Gly Thr Glu Asp Xaa Lys  
85 90 95

Arg Ala Tyr Leu Pro Arg Met Ala Ser Gly Glu Ile Arg Ala Thr Met  
100 105 110

Ala Leu Thr Glu Pro Xaa Gly Gly Ser Asp Leu Gln Asn Met Ser Thr  
115 120 125

Thr Ala Leu Pro Asp Pro Asp Ser Asp Xaa Leu Val Val Asn Gly Ala  
130 135 140

Lys Thr Xaa Ile Asn  
145

<210> 11

<211> 241

<212> DNA

<213> Mycobacterium avium paratuberculosis

<220>

<223> Description of Combined DNA/RNA Molecule:

immunogenic protein of M. avium paratuberculosis

<220>

<221> CDS

<222> (147)..(239)

<400> 11

gtgggggcaa gcccaattacg ttcgcatcga cccggcacag gcggtcgctc acgtcatcaa 60

catgccgctc atccccgatg aggctcgaat gaccttgcta cgcaggcgct gaacgcacga 120

cgaaacggac cggagggtgaa agggac atg agc cac gcc gat caa ctc gct cgg 173  
Met Ser His Ala Asp Gln Leu Ala Arg  
1 5

acg cac ctg gcg ccc gat cct gcg gac ctg tcg cgc ctg gtc gcc ggc 221  
Thr His Leu Ala Pro Asp Pro Ala Asp Leu Ser Arg Leu Val Ala Gly

2004 07 12 Sequence Listing

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10          15          20          25
acc cac cac gac ccg cac gg
Thr His His Asp Pro His
30

<210> 12
<211> 31
<212> PRT
<213> Mycobacterium avium paratuberculosis
<223> Description of Combined DNA/RNA Molecule:
        immunogenic protein of M. avium paratuberculosis

<400> 12
Met Ser His Ala Asp Gln Leu Ala Arg Thr His Leu Ala Pro Asp Pro
 1          5          10          15
Ala Asp Leu Ser Arg Leu Val Ala Gly Thr His His Asp Pro His
          20          25          30

<210> 13
<211> 236
<212> DNA
<213> Mycobacterium avium paratuberculosis

<220>
<223> Description of Combined DNA/RNA Molecule:
        immunogenic protein of M. avium paratuberculosis

<220>
<221> CDS
<222> (8)..(214)

<400> 13
ggacacc aac gtg acc ggg gtg ttt ctc acc gcc cag gcg gcg gcc cgg 49
          Asn Val Thr Gly Val Phe Leu Thr Ala Gln Ala Ala Arg
          1          5          10
gcg atg atg cgg cag ggc cgc ggc ggc gcc atc atc acc acc gcc tcg 97
Ala Met Met Arg Gln Gly Arg Gly Gly Ala Ile Ile Thr Thr Ala Ser
15          20          25          30
atg tcc ggg cac atc atc aac gtc ccg cag cag gtc ggc cac tac tgc 145
Met Ser Gly His Ile Ile Asn Val Pro Gln Gln Val Gly His Tyr Cys
          35          40          45
gcc agc aag gcg gcc gtg atc cag ctg acc aag gcc atg gcc gtc gaa 193
Ala Ser Lys Ala Ala Val Ile Gln Leu Thr Lys Ala Met Ala Val Glu
          50          55          60
ttc tgc agg atc cgt cga ctc tagactcgag caagcttatg ca 236
Phe Cys Arg Ile Arg Arg Leu
          65

<210> 14
<211> 69
<212> PRT
<213> Mycobacterium avium paratuberculosis
<223> Description of Combined DNA/RNA Molecule:

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2004 07 12 Sequence Listing  
immunogenic protein of M. avium paratuberculosis

<400> 14

Asn Val Thr Gly Val Phe Leu Thr Ala Gln Ala Ala Arg Ala Met  
1 5 10 15  
Met Arg Gln Gly Arg Gly Gly Ala Ile Ile Thr Thr Ala Ser Met Ser  
20 25 30  
Gly His Ile Ile Asn Val Pro Gln Gln Val Gly His Tyr Cys Ala Ser  
35 40 45  
Lys Ala Ala Val Ile Gln Leu Thr Lys Ala Met Ala Val Glu Phe Cys  
50 55 60  
Arg Ile Arg Arg Leu  
65

<210> 15

<211> 419

<212> DNA

<213> Mycobacterium avium paratuberculosis

<220>

<223> Description of Combined DNA/RNA Molecule:  
immunogenic protein of M. avium paratuberculosis

<220>

<221> CDS

<222> (25)..(417)

<223> /note="xaa at location 103 stands for Met, Val or  
Leu, Xaa at location 125 stands for Lys, Arg, Thr  
or Met"

<400> 15

cggccaccgc acccagggga ggcc atg act cac acc aag gcc ggt cgt gcc 51  
Met Thr His Thr Lys Ala Gly Arg Ala  
1 5  
gcg tgg ccg gcc gcc tgc gcg gtc gtc ctg tcc gcc gcc gcg ctg ttg 99  
Ala Trp Pro Ala Ala Cys Ala Val Val Leu Ser Ala Ala Ala Leu Leu  
10 15 20 25  
tgc gcg gca gcg gcc gcc gcg gac gaa gcc gat gac gcg ttc ctc gcc 147  
Cys Ala Ala Ala Ala Ala Ala Asp Glu Ala Asp Asp Ala Phe Leu Ala  
30 35 40  
ggc ctg gcc aag ggc ggc atc acc atg ttc gac gac gac gac gcg atc 195  
Gly Leu Ala Lys Gly Gly Ile Thr Met Phe Asp Asp Asp Asp Ala Ile  
45 50 55  
gcc atg ggc cac agc gtg tgc tcg agc atc gac gcc aac ccc aac gtg 243  
Ala Met Gly His Ser Val Cys Ser Ser Ile Asp Ala Asn Pro Asn Val  
60 65 70  
tcg atg ctg gcg ctg cgg ctg acc aag caa acc ccg ttg acg ccg aag 291  
Ser Met Leu Ala Leu Arg Leu Thr Lys Gln Thr Pro Leu Thr Pro Lys  
75 80 85  
caa tcc ggc tac ttc atc ggt ctt tcg gtc gcc agc tac ntg ccc gca 339  
Gln Ser Gly Tyr Phe Ile Gly Leu Ser Val Ala Ser Tyr Xaa Pro Ala  
Page 13

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90	95	100	105	
gta caa gga cga cgt cga ccc ctc gct ggg ctg gct gat ccc gcc gcc				387
Val Gln Gly Arg Arg Arg Pro Leu Ala Gly Leu Ala Asp Pro Ala Ala	110	115	120	
gct gat gtg ang ttg ccg gcc ggc atc ggc gt				419
Ala Asp Val Xaa Leu Pro Ala Gly Ile Gly	125	130		

<210> 16  
 <211> 131  
 <212> PRT  
 <213> Mycobacterium avium paratuberculosis  
 <223> Description of Combined DNA/RNA Molecule:  
 immunogenic protein of M. avium paratuberculosis

<400> 16  
 Met Thr His Thr Lys Ala Gly Arg Ala Ala Trp Pro Ala Ala Cys Ala  
 1 5 10 15  
 Val Val Leu Ser Ala Ala Ala Leu Leu Cys Ala Ala Ala Ala Ala Ala  
 20 25 30  
 Asp Glu Ala Asp Asp Ala Phe Leu Ala Gly Leu Ala Lys Gly Gly Ile  
 35 40 45  
 Thr Met Phe Asp Asp Asp Asp Ala Ile Ala Met Gly His Ser Val Cys  
 50 55 60  
 Ser Ser Ile Asp Ala Asn Pro Asn Val Ser Met Leu Ala Leu Arg Leu  
 65 70 75 80  
 Thr Lys Gln Thr Pro Leu Thr Pro Lys Gln Ser Gly Tyr Phe Ile Gly  
 85 90 95  
 Leu Ser Val Ala Ser Tyr Xaa Pro Ala Val Gln Gly Arg Arg Arg Pro  
 100 105 110  
 Leu Ala Gly Leu Ala Asp Pro Ala Ala Ala Asp Val Xaa Leu Pro Ala  
 115 120 125  
 Gly Ile Gly  
 130

<210> 17  
 <211> 392  
 <212> DNA  
 <213> Mycobacterium avium paratuberculosis  
 <220>  
 <223> Description of Combined DNA/RNA Molecule:  
 immunogenic protein of M. avium paratuberculosis  
 <220>  
 <221> CDS  
 <222> (94)..(390)  
 <223> /note="Xaa at location 88 stands for Arg or Thr,  
 xaa at location 99 stands for Gln or Pro"



2004 07 12 Sequence Listing

<210> 19

<211> 1884

<212> DNA

<213> Mycobacterium avium paratuberculosis

<220>

<223> Description of Combined DNA/RNA Molecule:  
immunogenic protein of M. avium paratuberculosis

<220>

<221> CDS

<222> (13)..(1884)

<400> 19

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taaccaggag ca atg gct cgt gcg gtc ggt atc gac ctc ggg acc acc aac 51
          Met Ala Arg Ala Val Gly Ile Asp Leu Gly Thr Thr Asn
              1              5              10

tcc gtc gtc gca gtc ctc gag ggc ggt gac ccc gtc gtc gtc gcc aac 99
Ser Val Val Ala Val Leu Glu Gly Gly Asp Pro Val Val Val Ala Asn
    15              20              25

tcc gag ggc tcg cgg acc acc ccg tcc atc gtc gcg ttc gcc cgc aac 147
Ser Glu Gly Ser Arg Thr Thr Pro Ser Ile Val Ala Phe Ala Arg Asn
    30              35              40              45

ggc gag gtg ctc gtc ggc cag ccc gcc aag aac cag gcg gtg acc aac 195
Gly Glu Val Leu Val Gly Gln Pro Ala Lys Asn Gln Ala Val Thr Asn
    50              55              60

gtc gac cgc acc atc cgt tcg gtc aag cgg cac atg ggc acc gac tgg 243
Val Asp Arg Thr Ile Arg Ser Val Lys Arg His Met Gly Thr Asp Trp
    65              70              75

tcc atc gag atc gac ggc aag aaa tac acc gct cag gag atc agc gcc 291
Ser Ile Glu Ile Asp Gly Lys Lys Tyr Thr Ala Gln Glu Ile Ser Ala
    80              85              90

cgc gtg ctg atg aag ctc aag cgc gac gcc gag gcc tat ctg ggt gag 339
Arg Val Leu Met Lys Leu Lys Arg Asp Ala Glu Ala Tyr Leu Gly Glu
    95              100              105

gac atc acc gac gcg gtc atc acc gta ccg gcg tac ttc aac gac gcc 387
Asp Ile Thr Asp Ala Val Ile Thr Val Pro Ala Tyr Phe Asn Asp Ala
   110              115              120              125

cag cgt cag gcg acc aag gaa gcc ggc cag atc gcc ggc ctc aac gtg 435
Gln Arg Gln Ala Thr Lys Glu Ala Gly Gln Ile Ala Gly Leu Asn Val
   130              135              140

ctg cgc atc gtc aac gag ccg acc gcg gcc gcg ctg gcc tac ggc ctg 483
Leu Arg Ile Val Asn Glu Pro Thr Ala Ala Ala Leu Ala Tyr Gly Leu
   145              150              155

gac aag ggc gag aag gag cag acc atc ctg gtc ttc gac ctc ggc ggc 531
Asp Lys Gly Glu Lys Glu Gln Thr Ile Leu Val Phe Asp Leu Gly Gly
   160              165              170

ggc acg ttc gac gtt tcg ctg ctc gag atc ggc gag ggt gtg gtc gag 579
Gly Thr Phe Asp Val Ser Leu Leu Glu Ile Gly Glu Gly Val Val Glu
   175              180              185

gtc cgc gcc acc agc ggt gac aac caa ctc ggt ggc gac gac tgg gac 627

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2004 07 12 Sequence Listing																
Val 190	Arg	Ala	Thr	Ser	Gly 195	Asp	Asn	Gln	Leu	Gly 200	Gly	Asp	Asp	Trp	Asp 205	
gac Asp	cgg Arg	atc Ile	gtc Val	aac Asn 210	tgg Trp	ctg Leu	gtc Val	gac Asp	aag Lys 215	ttc Phe	aag Lys	ggc Gly	acc Thr	agc Ser 220	ggc Gly	675
atc Ile	gac Asp	ctg Leu	acc Thr 225	aag Lys	gac Asp	aag Lys	atg Met	gcc Ala 230	atg Met	cag Gln	cgg Arg	ctg Leu	cgt Arg 235	gag Glu	gcc Ala	723
gcc Ala	gag Glu	aag Lys 240	gcc Ala	aag Lys	atc Ile	gag Glu 245	ttg Leu	tcc Ser	agc Ser	tcg Ser	cag Gln	agc Ser 250	acc Thr	tcg Ser	atc Ile	771
aac Asn 255	ctg Leu	ccc Pro	tac Tyr	atc Ile	acc Thr	gtc Val 260	gac Asp	gcg Ala	gac Asp	aag Lys	aac Asn 265	ccg Pro	ctg Leu	ttc Phe	ctc Leu	819
gac Asp 270	gag Glu	cag Gln	ctg Leu	acc Thr	cgc Arg 275	gcc Ala	gaa Glu	ttc Phe	cag Gln	cgc Arg 280	atc Ile	acc Thr	cag Gln	gat Asp	ctg Leu 285	867
ctg Leu	gac Asp	cgc Arg	acc Thr	cgt Arg 290	cag Gln	ccg Pro	ttc Phe	aag Lys	tcg Ser 295	gtg Val	atc Ile	gcc Ala	gac Asp	gcc Ala 300	ggc Gly	915
atc Ile	tcg Ser	gtg Val	tcc Ser 305	gac Asp	atc Ile	gac Asp	cac His	gtg Val 310	gtg Val	ctg Leu	gtg Val	ggt Gly 315	ggt Gly	tcc Ser	acc Thr	963
cgg Arg	atg Met	ccc Pro 320	gcg Ala	gtg Val	acc Thr	gac Asp	ctg Leu 325	gtc Val	aag Lys	gaa Glu	ctc Leu	acc Thr 330	ggc Gly	ggc Gly	aag Lys	1011
gag Glu 335	ccc Pro	aac Asn	aag Lys	ggc Gly	gtc Val	aac Asn 340	ccc Pro	gac Asp	gag Glu	gtt Val	gtc Val 345	gcg Ala	gtg Val	ggt Gly	gcc Ala	1059
gcc Ala 350	ctg Leu	cag Gln	gcc Ala	ggt Gly	gtg Val 355	ctt Leu	aag Lys	ggc Gly	gag Glu	gtg Val 360	aaa Lys	gac Asp	gtt Val	ctg Leu	ctg Leu 365	1107
ctt Leu	gac Asp	gtt Val	acg Thr	ccg Pro 370	ctg Leu	agc Ser	ctg Leu	ggt Gly	atc Ile 375	gag Glu	acc Thr	aag Lys	ggt Gly 380	ggc Gly	gtg Val	1155
atg Met	acc Thr	aag Lys	ctg Leu 385	atc Ile	gaa Glu	cgc Arg	aac Asn 390	acc Thr	acc Thr	atc Ile	ccg Pro	acc Thr	aag Lys 395	cgg Arg	tcc Ser	1203
gag Glu	acg Thr	ttc Phe 400	acc Thr	acg Thr	gcc Ala	gac Asp	gac Asp 405	aac Asn	cag Gln	ccg Pro	tcg Ser	gtg Val 410	cag Gln	atc Ile	cag Gln	1251
gtg Val	tat Tyr 415	cag Gln	ggt Gly	gag Glu	cgc Arg	gaa Glu 420	atc Ile	gcc Ala	gcg Ala	cac His	aac Asn 425	aag Lys	ctg Leu	ctc Leu	ggc Gly	1299
tcc Ser 430	ttc Phe	gag Glu	ctg Leu	acc Thr	gga Gly 435	att Ile	ccg Pro	ccg Pro	gcg Ala	ccc Pro 440	cgc Arg	ggc Gly	gtg Val	ccg Pro	cag Gln 445	1347

# 2004 07 12 Sequence Listing

atc gag gtc acc ttc gac atc gac gcc aac ggc atc gtg cac gtc acc	1395
Ile Glu Val Thr Phe Asp Ile Asp Ala Asn Gly Ile Val His Val Thr	
450 455 460	
gcc aag gac aag ggc acc ggt aag gag aac acg atc aag atc cag gag	1443
Ala Lys Asp Lys Gly Thr Gly Lys Glu Asn Thr Ile Lys Ile Gln Glu	
465 470 475	
ggc tcc ggc ctg tcc aag gag gag atc gac cgg atg atc aag gac gcc	1491
Gly Ser Gly Leu Ser Lys Glu Glu Ile Asp Arg Met Ile Lys Asp Ala	
480 485 490	
gag gcg cac gcc gag gag gac cgc aag agg cgc gag gaa gcc gac gtc	1539
Glu Ala His Ala Glu Glu Asp Arg Lys Arg Arg Glu Glu Ala Asp Val	
495 500 505	
cgc aac caa gcg gaa tcg ctt gtc tac cag acg gag aag ttc gtc aag	1587
Arg Asn Gln Ala Glu Ser Leu Val Tyr Gln Thr Glu Lys Phe Val Lys	
510 515 520 525	
gac cag cgc gag gcc gag ggc ggc tcg aag gtt ccc gag gag acg ctg	1635
Asp Gln Arg Glu Ala Glu Gly Gly Ser Lys Val Pro Glu Glu Thr Leu	
530 535 540	
tcc aag gtc gac gcc gcg atc gcc gac gcc aag acg gcc ctg ggc ggc	1683
Ser Lys Val Asp Ala Ala Ile Ala Asp Ala Lys Thr Ala Leu Gly Gly	
545 550 555	
acc gac atc acc gcg atc aag tcg gcg atg gag aag ctc ggc cag gag	1731
Thr Asp Ile Thr Ala Ile Lys Ser Ala Met Glu Lys Leu Gly Gln Glu	
560 565 570	
tcg caa gcg ctg gga cag gca atc tac gag gcc acc cag gcc gag tcc	1779
Ser Gln Ala Leu Gly Gln Ala Ile Tyr Glu Ala Thr Gln Ala Glu Ser	
575 580 585	
gcc cag gct ggc ggg ccg gac ggt gcc gcg gcc ggc ggc ggc tcc gga	1827
Ala Gln Ala Gly Gly Pro Asp Gly Ala Ala Ala Gly Gly Gly Ser Gly	
590 595 600 605	
tcc gcc gac gat gtt gtg gac gcg gag gtg gtc gac gat gac cgg gag	1875
Ser Ala Asp Asp Val Val Asp Ala Glu Val Val Asp Asp Asp Arg Glu	
610 615 620	
tcc aag tga	1884
Ser Lys	

<210> 20

<211> 623

<212> PRT

<213> Mycobacterium avium paratuberculosis

<223> Description of Combined DNA/RNA Molecule:

immunogenic protein of M. avium paratuberculosis

<400> 20

Met	Ala	Arg	Ala	Val	Gly	Ile	Asp	Leu	Gly	Thr	Thr	Asn	Ser	Val	Val
1				5					10					15	
Ala	Val	Leu	Glu	Gly	Gly	Asp	Pro	Val	Val	Val	Ala	Asn	Ser	Glu	Gly
		20						25					30		
Ser	Arg	Thr	Thr	Pro	Ser	Ile	Val	Ala	Phe	Ala	Arg	Asn	Gly	Glu	Val
	35					40						45			
Leu	Val	Gly	Gln	Pro	Ala	Lys	Asn	Gln	Ala	Val	Thr	Asn	Val	Asp	Arg

2004 07 12 Sequence Listing

50	55	60																	
Thr	Ile	Arg	Ser	Val	Lys	Arg	His	Met	Gly	Thr	Asp	Trp	Ser	Ile	Glu				
65					70					75					80				
Ile	Asp	Gly	Lys	Lys	Tyr	Thr	Ala	Gln	Glu	Ile	Ser	Ala	Arg	Val	Leu				
				85					90					95					
Met	Lys	Leu	Lys	Arg	Asp	Ala	Glu	Ala	Tyr	Leu	Gly	Glu	Asp	Ile	Thr				
			100					105					110						
Asp	Ala	Val	Ile	Thr	Val	Pro	Ala	Tyr	Phe	Asn	Asp	Ala	Gln	Arg	Gln				
		115					120					125							
Ala	Thr	Lys	Glu	Ala	Gly	Gln	Ile	Ala	Gly	Leu	Asn	Val	Leu	Arg	Ile				
		130				135					140								
Val	Asn	Glu	Pro	Thr	Ala	Ala	Ala	Leu	Ala	Tyr	Gly	Leu	Asp	Lys	Gly				
145					150					155					160				
Glu	Lys	Glu	Gln	Thr	Ile	Leu	Val	Phe	Asp	Leu	Gly	Gly	Gly	Thr	Phe				
			165						170					175					
Asp	Val	Ser	Leu	Glu	Ile	Gly	Glu	Gly	Val	Val	Glu	Val	Arg	Ala					
		180					185					190							
Thr	Ser	Gly	Asp	Asn	Gln	Leu	Gly	Gly	Asp	Asp	Trp	Asp	Asp	Arg	Ile				
		195					200					205							
Val	Asn	Trp	Leu	Val	Asp	Lys	Phe	Lys	Gly	Thr	Ser	Gly	Ile	Asp	Leu				
		210				215					220								
Thr	Lys	Asp	Lys	Met	Ala	Met	Gln	Arg	Leu	Arg	Glu	Ala	Ala	Glu	Lys				
225				230						235					240				
Ala	Lys	Ile	Glu	Leu	Ser	Ser	Ser	Gln	Ser	Thr	Ser	Ile	Asn	Leu	Pro				
			245					250						255					
Tyr	Ile	Thr	Val	Asp	Ala	Asp	Lys	Asn	Pro	Leu	Phe	Leu	Asp	Glu	Gln				
			260					265						270					
Leu	Thr	Arg	Ala	Glu	Phe	Gln	Arg	Ile	Thr	Gln	Asp	Leu	Leu	Asp	Arg				
		275					280					285							
Thr	Arg	Gln	Pro	Phe	Lys	Ser	Val	Ile	Ala	Asp	Ala	Gly	Ile	Ser	Val				
		290				295					300								
Ser	Asp	Ile	Asp	His	Val	Val	Leu	Val	Gly	Gly	Ser	Thr	Arg	Met	Pro				
305				310						315					320				
Ala	Val	Thr	Asp	Leu	Val	Lys	Glu	Leu	Thr	Gly	Gly	Lys	Glu	Pro	Asn				
			325						330					335					
Lys	Gly	Val	Asn	Pro	Asp	Glu	Val	Val	Ala	Val	Gly	Ala	Ala	Leu	Gln				
			340					345					350						
Ala	Gly	Val	Leu	Lys	Gly	Glu	Val	Lys	Asp	Val	Leu	Leu	Leu	Asp	Val				
		355					360					365							
Thr	Pro	Leu	Ser	Leu	Gly	Ile	Glu	Thr	Lys	Gly	Gly	Val	Met	Thr	Lys				
		370			375						380								
Leu	Ile	Glu	Arg	Asn	Thr	Thr	Ile	Pro	Thr	Lys	Arg	Ser	Glu	Thr	Phe				
385				390						395					400				
Thr	Thr	Ala	Asp	Asp	Gln	Pro	Ser	Val	Gln	Ile	Gln	Val	Tyr	Gln					
			405					410					415						
Gly	Glu	Arg	Glu	Ile	Ala	Ala	His	Asn	Lys	Leu	Leu	Gly	Ser	Phe	Glu				
			420					425					430						
Leu	Thr	Gly	Ile	Pro	Pro	Ala	Pro	Arg	Gly	Val	Pro	Gln	Ile	Glu	Val				
		435					440					445							
Thr	Phe	Asp	Ile	Asp	Ala	Asn	Gly	Ile	Val	His	Val	Thr	Ala	Lys	Asp				
		450				455					460								
Lys	Gly	Thr	Gly	Lys	Glu	Asn	Thr	Ile	Lys	Ile	Gln	Glu	Gly	Ser	Gly				
465				470						475					480				
Leu	Ser	Lys	Glu	Glu	Ile	Asp	Arg	Met	Ile	Lys	Asp	Ala	Glu	Ala	His				
			485					490						495					
Ala	Glu	Glu	Asp	Arg	Lys	Arg	Arg	Glu	Glu	Ala	Asp	Val	Arg	Asn	Gln				
			500					505					510						
Ala	Glu	Ser	Leu	Val	Tyr	Gln	Thr	Glu	Lys	Phe	Val	Lys	Asp	Gln	Arg				
		515					520					525							
Glu	Ala	Glu	Gly	Gly	Ser	Lys	Val	Pro	Glu	Glu	Thr	Leu	Ser	Lys	Val				
		530			535						540								
Asp	Ala	Ala	Ile	Ala	Asp	Ala	Lys	Thr	Ala	Leu	Gly	Gly	Thr	Asp	Ile				
545				550						555					560				

# 2004 07 12 Sequence Listing

Thr Ala Ile Lys Ser Ala Met Glu Lys Leu Gly Gln Glu Ser Gln Ala  
 565 570 575  
 Leu Gly Gln Ala Ile Tyr Glu Ala Thr Gln Ala Glu Ser Ala Gln Ala  
 580 585 590  
 Gly Gly Pro Asp Gly Ala Ala Ala Gly Gly Gly Ser Gly Ser Ala Asp  
 595 600 605  
 Asp Val Val Asp Ala Glu Val Val Asp Asp Asp Arg Glu Ser Lys  
 610 615 620

<210> 21

<211> 1701

<212> DNA

<213> Mycobacterium avium paratuberculosis

<220>

<223> Description of Combined DNA/RNA Molecule:  
immunogenic protein of M. avium paratuberculosis

<220>

<221> CDS

<222> (76)..(1701)

<400> 21

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aggaatcact tcgca atg gcc aag aca att gcg tac gac gaa gag gcc cgt 111  
 Met Ala Lys Thr Ile Ala Tyr Asp Glu Glu Ala Arg  
 1 5 10

cgc ggc ctc gag cgg ggg ctc aac gcc ctc gcc gac gcg gta aag gtc 159  
 Arg Gly Leu Glu Arg Gly Leu Asn Ala Leu Ala Asp Ala Val Lys Val  
 15 20 25

acg ttg ggc ccc aag ggt cgc aac gtc gtc ctg gag aag aag tgg ggt 207  
 Thr Leu Gly Pro Lys Gly Arg Asn Val Val Leu Glu Lys Lys Trp Gly  
 30 35 40

gcc ccc acg atc acc aac gat ggt gtg tcc atc gcc aag gag atc gag 255  
 Ala Pro Thr Ile Thr Asn Asp Gly Val Ser Ile Ala Lys Glu Ile Glu  
 45 50 55 60

ctg gag gac ccg tac gag aag atc ggc gcc gag ctg gtc aag gaa gtc 303  
 Leu Glu Asp Pro Tyr Glu Lys Ile Gly Ala Glu Leu Val Lys Glu Val  
 65 70 75

gcc aag aag acc gac gac gtc gcc ggt gac ggc acg acg acg gcc acc 351  
 Ala Lys Lys Thr Asp Asp Val Ala Gly Asp Gly Thr Thr Thr Ala Thr  
 80 85 90

gtg ctc gcc cag gcg ttg gtc cgc gag ggc ctg cgc aac gtc gcg gcc 399  
 Val Leu Ala Gln Ala Leu Val Arg Glu Gly Leu Arg Asn Val Ala Ala  
 95 100 105

ggc gcc aac ccg ctg ggt ctc aag cgc ggc atc gag aag gcc gtc gag 447  
 Gly Ala Asn Pro Leu Gly Leu Lys Arg Gly Ile Glu Lys Ala Val Glu  
 110 115 120

aag gtc acc gag acc ctg ctc aag tcg gcc aag gag gtc gag acc aag 495  
 Lys Val Thr Glu Thr Leu Leu Lys Ser Ala Lys Glu Val Glu Thr Lys  
 125 130 135 140

2004 07 12 Sequence Listing

gac Asp	cag Gln	atc Ile	gct Ala	gcc Ala 145	acc Thr	gcg Ala	gcc Ala	atc Ile	tcc Ser 150	gcg Ala	ggc Gly	gac Asp	cag Gln	tcg Ser 155	atc Ile	543
ggc Gly	gac Asp	ctg Leu	atc Ile 160	gcc Ala	gag Glu	gcg Ala	atg Met	gac Asp 165	aag Lys	gtc Val	ggc Gly	aac Asn	gag Glu 170	ggc Gly	gtc Val	591
atc Ile	acc Thr	gtc Val 175	gag Glu	gag Glu	tcc Ser	aac Asn	acc Thr 180	ttc Phe	ggc Gly	ctg Leu	cag Gln	ctc Leu 185	gag Glu	ctc Leu	acc Thr	639
gag Glu	ggt Gly 190	atg Met	cgg Arg	ttc Phe	gac Asp	aag Lys 195	ggt Gly	tac Tyr	atc Ile	tcg Ser	ggc Gly 200	tac Tyr	ttc Phe	gtc Val	acg Thr	687
gac Asp 205	gcc Ala	gag Glu	cgt Arg	cag Gln	gaa Glu 210	gcg Ala	gtc Val	ctc Leu	gag Glu	gac Asp 215	ccg Pro	ttc Phe	atc Ile	ctg Leu	ctg Leu 220	735
gtc Val	agc Ser	tcc Ser	aag Lys	gtc Val 225	tcg Ser	acc Thr	gtc Val	aag Lys	gac Asp 230	ctg Leu	ctg Leu	ccg Pro	ctg Leu	ctg Leu 235	gag Glu	783
aag Lys	gtc Val	atc Ile	cag Gln 240	gcc Ala	ggc Gly	aag Lys	ccg Pro	ctg Leu 245	ctg Leu	atc Ile	atc Ile	gcc Ala	gag Glu 250	gac Asp	gtc Val	831
gag Glu	ggc Gly 255	gag Glu	gcc Ala	ctg Leu	tcc Ser	acc Thr	ctg Leu 260	gtc Val	gtc Val	aac Asn	aag Lys	atc Ile 265	cgc Arg	ggc Gly	acc Thr	879
ttc Phe	aag Lys 270	tcg Ser	gtg Val	gcc Ala	gtc Val	aag Lys 275	gcg Ala	ccc Pro	ggc Gly	ttc Phe	ggc Gly 280	gac Asp	cgc Arg	cgc Arg	aag Lys	927
gcg Ala 285	atg Met	ctt Leu	cag Gln	gac Asp	atg Met 290	gcc Ala	atc Ile	ctc Leu	acc Thr	ggc Gly 295	ggc Gly	cag Gln	gtc Val	atc Ile	agc Ser 300	975
gaa Glu	gag Glu	gtc Val	ggc Gly 305	ctg Leu	tcg Ser	ctg Leu	gag Glu	agc Ser	gcc Ala 310	gac Asp	atc Ile	tcg Ser	ctg Leu	ctc Leu 315	ggt Gly	1023
aag Lys	gcc Ala	cgc Arg	aag Lys 320	gtc Val	gtc Val	gtc Val	acc Thr	aag Lys 325	gac Asp	gag Glu	acc Thr	acc Thr	atc Ile 330	gtc Val	gag Glu	1071
ggc Gly	gcc Ala	ggt Gly 335	gac Asp	tcc Ser	gac Asp	gcc Ala	atc Ile 340	gcc Ala	ggc Gly	cgc Arg	gtg Val	gcc Ala 345	cag Gln	atc Ile	cgc Arg	1119
acc Thr	gag Glu 350	atc Ile	gag Glu	aac Asn	agc Ser	gac Asp 355	tcc Ser	gac Asp	tac Tyr	gac Asp	cgc Arg 360	gag Glu	aag Lys	ctg Leu	cag Gln	1167
gag Glu 365	cgg Arg	ctg Leu	gcc Ala	aag Lys	ctg Leu 370	gcc Ala	ggc Gly	ggc Gly	gtg Val	gcg Ala 375	gtg Val	atc Ile	aag Lys	gcc Ala	ggc Gly 380	1215
gcc Ala	gcg Ala	acc Thr	gag Glu	gtc Val 385	gag Glu	ctc Leu	aag Lys	gag Glu	cgc Arg 390	aag Lys	cac His	cgc Arg	atc Ile	gag Glu 395	gac Asp	1263

# 2004 07 12 Sequence Listing

gcg gtc cgc aac gcc aag gcg gcc gtg gag gag ggc atc gtc gcc ggc	1311
Ala Val Arg Asn Ala Lys Ala Ala Val Glu Glu Gly Ile Val Ala Gly	
400 405 410	
ggt ggc gtg gcc ctg ctg cac gcg atc ccg gct ctg gac gag ctg aag	1359
Gly Gly Val Ala Leu Leu His Ala Ile Pro Ala Leu Asp Glu Leu Lys	
415 420 425	
ctc gag ggc gaa gag gcg acc ggc gcc aac atc gtc cgg gtg gcc ctc	1407
Leu Glu Gly Glu Glu Ala Thr Gly Ala Asn Ile Val Arg Val Ala Leu	
430 435 440	
gag gct ccg ctg aag cag atc gcc ttc aac ggt ggc ctg gag ccc ggc	1455
Glu Ala Pro Leu Lys Gln Ile Ala Phe Asn Gly Gly Leu Glu Pro Gly	
445 450 455 460	
gtg gtg gcc gag aag gtc cgc aac tcg ccc gcc ggt acc ggc ctc aac	1503
Val Val Ala Glu Lys Val Arg Asn Ser Pro Ala Gly Thr Gly Leu Asn	
465 470 475	
gcc gcc acc ggt gag tac gag gac ctg ctc aag gcc ggc att gcc gac	1551
Ala Ala Thr Gly Glu Tyr Glu Asp Leu Leu Lys Ala Gly Ile Ala Asp	
480 485 490	
ccg gtg aag gtc acc cgc tcg gcg ctg cag aac gcg gcg tcc atc gcg	1599
Pro Val Lys Val Thr Arg Ser Ala Leu Gln Asn Ala Ala Ser Ile Ala	
495 500 505	
ggg ctg ttc ctg acc acc gag gcg gtc gtc gcc gac aag ccg gag aag	1647
Gly Leu Phe Leu Thr Thr Glu Ala Val Val Ala Asp Lys Pro Glu Lys	
510 515 520	
gcg gcc gct ccc gcg ggc gac ccg acc ggc ggc atg ggc ggc atg gac	1695
Ala Ala Ala Pro Ala Gly Asp Pro Thr Gly Gly Met Gly Gly Met Asp	
525 530 535 540	
ttc tga	1701
Phe	

<210> 22

<211> 541

<212> PRT

<213> Mycobacterium avium paratuberculosis

<223> Description of Combined DNA/RNA Molecule:

immunogenic protein of M. avium paratuberculosis

<400> 22

Met	Ala	Lys	Thr	Ile	Ala	Tyr	Asp	Glu	Glu	Ala	Arg	Arg	Gly	Leu	Glu
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Arg	Gly	Leu	Asn	Ala	Leu	Ala	Asp	Ala	Val	Lys	Val	Thr	Leu	Gly	Pro
			20					25					30		
Lys	Gly	Arg	Asn	Val	Val	Leu	Glu	Lys	Lys	Trp	Gly	Ala	Pro	Thr	Ile
		35				40					45				
Thr	Asn	Asp	Gly	Val	Ser	Ile	Ala	Lys	Glu	Ile	Glu	Leu	Glu	Asp	Pro
	50				55					60					
Tyr	Glu	Lys	Ile	Gly	Ala	Glu	Leu	Val	Lys	Glu	Val	Ala	Lys	Lys	Thr
	65				70					75				80	
Asp	Asp	Val	Ala	Gly	Asp	Gly	Thr	Thr	Thr	Ala	Thr	Val	Leu	Ala	Gln
				85					90					95	
Ala	Leu	Val	Arg	Glu	Gly	Leu	Arg	Asn	Val	Ala	Ala	Gly	Ala	Asn	Pro
			100					105					110		

2004 07 12 Sequence Listing

Leu	Gly	Leu	Lys	Arg	Gly	Ile	Glu	Lys	Ala	Val	Glu	Lys	Val	Thr	Glu
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Thr	Leu	Leu	Lys	Ser	Ala	Lys	Glu	Val	Glu	Thr	Lys	Asp	Gln	Ile	Ala
	130					135					140				
Ala	Thr	Ala	Ala	Ile	Ser	Ala	Gly	Asp	Gln	Ser	Ile	Gly	Asp	Leu	Ile
	145				150					155					160
Ala	Glu	Ala	Met	Asp	Lys	Val	Gly	Asn	Glu	Gly	Val	Ile	Thr	Val	Glu
				165					170						175
Glu	Ser	Asn	Thr	Phe	Gly	Leu	Gln	Leu	Glu	Leu	Thr	Glu	Gly	Met	Arg
			180						185				190		
Phe	Asp	Lys	Gly	Tyr	Ile	Ser	Gly	Tyr	Phe	Val	Thr	Asp	Ala	Glu	Arg
		195					200					205			
Gln	Glu	Ala	Val	Leu	Glu	Asp	Pro	Phe	Ile	Leu	Leu	Val	Ser	Ser	Lys
	210					215					220				
Val	Ser	Thr	Val	Lys	Asp	Leu	Leu	Pro	Leu	Leu	Glu	Lys	Val	Ile	Gln
	225				230					235					240
Ala	Gly	Lys	Pro	Leu	Leu	Ile	Ile	Ala	Glu	Asp	Val	Glu	Gly	Glu	Ala
				245					250					255	
Leu	Ser	Thr	Leu	Val	Val	Asn	Lys	Ile	Arg	Gly	Thr	Phe	Lys	Ser	Val
			260					265					270		
Ala	Val	Lys	Ala	Pro	Gly	Phe	Gly	Asp	Arg	Arg	Lys	Ala	Met	Leu	Gln
		275					280					285			
Asp	Met	Ala	Ile	Leu	Thr	Gly	Gly	Gln	Val	Ile	Ser	Glu	Glu	Val	Gly
	290					295					300				
Leu	Ser	Leu	Glu	Ser	Ala	Asp	Ile	Ser	Leu	Leu	Gly	Lys	Ala	Arg	Lys
	305				310					315					320
Val	Val	Val	Thr	Lys	Asp	Glu	Thr	Thr	Ile	Val	Glu	Gly	Ala	Gly	Asp
				325					330					335	
Ser	Asp	Ala	Ile	Ala	Gly	Arg	Val	Ala	Gln	Ile	Arg	Thr	Glu	Ile	Glu
			340					345					350		
Asn	Ser	Asp	Ser	Asp	Tyr	Asp	Arg	Glu	Lys	Leu	Gln	Glu	Arg	Leu	Ala
		355					360					365			
Lys	Leu	Ala	Gly	Gly	Val	Ala	Val	Ile	Lys	Ala	Gly	Ala	Ala	Thr	Glu
	370					375					380				
Val	Glu	Leu	Lys	Glu	Arg	Lys	His	Arg	Ile	Glu	Asp	Ala	Val	Arg	Asn
	385				390					395					400
Ala	Lys	Ala	Ala	Val	Glu	Glu	Gly	Ile	Val	Ala	Gly	Gly	Gly	Val	Ala
				405					410					415	
Leu	Leu	His	Ala	Ile	Pro	Ala	Leu	Asp	Glu	Leu	Lys	Leu	Glu	Gly	Glu
			420					425					430		
Glu	Ala	Thr	Gly	Ala	Asn	Ile	Val	Arg	Val	Ala	Leu	Glu	Ala	Pro	Leu
		435					440					445			
Lys	Gln	Ile	Ala	Phe	Asn	Gly	Gly	Leu	Glu	Pro	Gly	Val	Val	Ala	Glu
	450					455					460				
Lys	Val	Arg	Asn	Ser	Pro	Ala	Gly	Thr	Gly	Leu	Asn	Ala	Ala	Thr	Gly
	465				470					475					480
Glu	Tyr	Glu	Asp	Leu	Leu	Lys	Ala	Gly	Ile	Ala	Asp	Pro	Val	Lys	Val
				485					490					495	
Thr	Arg	Ser	Ala	Leu	Gln	Asn	Ala	Ala	Ser	Ile	Ala	Gly	Leu	Phe	Leu
			500					505					510		
Thr	Thr	Glu	Ala	Val	Val	Ala	Asp	Lys	Pro	Glu	Lys	Ala	Ala	Ala	Pro
		515					520					525			
Ala	Gly	Asp	Pro	Thr	Gly	Gly	Met	Gly	Gly	Met	Asp	Phe			
	530					535					540				